UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
WASHINGTON, D.C. 20555-0001

May 4, 2007

RIS 2007-09: EXAMPLES OF RECURRING REQUESTS FOR ADDITIONAL INFORMATION (RAIS) FOR 10 CFR PART 71 AND 72 APPLICATIONS

ADDRESSEES

All holders of, and applicants for, a: (1) 10 CFR Part 71 certificate of compliance (CoC) for a radioactive material transportation package; (2) 10 CFR Part 72 CoC for a spent fuel storage cask; and (3) 10 CFR Part 72 specific license for an independent spent fuel storage installation (ISFSI).

INTENT

The U.S. Nuclear Regulatory Commission (NRC) is issuing this regulatory issue summary (RIS) to inform addressees of RAI questions that have been asked repeatedly when reviewing applications and amendments under Parts 71 and 72, so as to illustrate technical areas in which applicants may be able to address issues before submitting applications for NRC review. No specific action or written response is required.

BACKGROUND

The Division of Spent Fuel Storage and Transportation (SFST) in the Office of Nuclear Material Safety and Safeguards is responsible for the review and approval of applications submitted, in accordance with Parts 71 and 72, for radioactive material transportation packages, dry cask storage systems, and ISFSIs. NRC staff currently uses four standard review plans (SRPs) (i.e., NUREGs-1536, -1567, -1609 and -1617) to help standardize the staff's review of applications. Each SRP summarizes the regulatory requirements necessary for approval of an application and describes the procedures that SFST staff uses to determine that the regulatory requirements have been satisfied. The SRPs are living documents that are updated and revised as regulations or practices change, and are supplemented, as needed, by issuing interim staff guidance (ISGs) documents, to identify emergent issues and develop staff positions in a timely manner.

In addition to the technical review guidance provided by the SRPs and ISGs, SFST uses a set of guidelines to define the expectations, for interactions between SFST and licensees and applicants, known as the rules of engagement, during the licensing process. These rules provide guidelines for the quality and completeness of applications; scheduling the review of an application; performing the acknowledgment and technical review; and preparing RAIs, safety evaluation reports, CoCs, and licenses (ref. RIS-04-020, "NRC REGULATORY ISSUE

SUMMARY 2004-20 LESSONS LEARNED FROM REVIEW OF 10 CFR PARTS 71 AND 72 APPLICATIONS," 12/16/2004)

SUMMARY OF ISSUE

During the meeting with industry representatives at the Licensing Process Conference in February 2005, the ensuing dialogue identified that it might be possible to reduce the number of RAI questions asked in conjunction with a certification action if the staff could identify a list of examples of RAIs that NRC repeatedly has had to address to multiple applicants.

In the past, RAI responses provided by applicants have frequently resulted in additional RAIs, because applicants often chose to address staff concerns using new or different approaches, rather than directly answering the RAI questions posed. This type of response is acceptable, but on many occasions has increased the review time and impacted the review schedule. The staff has prepared the attached information regarding recurring RAIs which details the issues addressed by many of the recurring RAIs, as well as potential resolutions of these issues.

Note that this list is not exhaustive and in no way limits the scope of questions that may be asked by NRC staff in evaluating the safety of any applicant's license or CoC application. The attached list of common RAI questions is meant as a guide or reference for applicants to use, when preparing their applications, as an attempt to reduce or eliminate potential RAI questions. Although the RAIs are grouped by technical discipline, to the extent possible, many of the underlying themes of the questions may be applicable to various areas, rather than to just one.

Also note that this list only addresses Part 71 and 72 recurring RAI questions and does not address Department of Transportation revalidation requests.

BACKFIT DISCUSSION

This RIS requires no action nor written response and is, therefore, not a backfit. Consequently, the staff did not perform a backfit analysis.

FEDERAL REGISTER NOTIFICATION

A notice of opportunity for public comment on this RIS was not published in the *Federal Register* because this RIS is informational and pertains to a staff position that does not represent a departure from current regulatory requirements and practice.

CONGRESSIONAL REVIEW ACT

This generic letter is not a rule as designated by the Congressional Review Act (5 U.S.C. §§801-888) and therefore, is not subject to the Act.

PAPERWORK REDUCTION ACT STATEMENT

This RIS does not contain information collections and, therefore, is not subject to the requirements of the Paperwork Reduction Act of 1995 (44 U.S.C. 350,1 et seq.).

CONTACT

Please direct any questions about this matter to the technical contact listed below.

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Attachments:
1. "Recurring RAI Examples"
2. "List of Recently Issued NMSS Generic Communications"

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Recurring RAI Examples

Examples of Recurrent Thermal RAIs

1. Provide additional details on how computational modeling was performed.

   For the staff to efficiently review cask and package analyses, the application should include sufficient details on how the analyses were performed. Depending on the complexity of the proposed design, the staff could consider it necessary to perform confirmatory analyses. Because cask and package analyses may contain many parameters that can change the results of the analyses if treated inappropriately, situations may exist where the staff may want to verify the validity of an applicant's analysis model and the methodology used to create the model. Therefore, the staff is always encouraging applicants to submit full documentation and validation of the analytical methods used. This documentation will enhance the efficiency of staff review, minimize the need for additional questions, and provide for a shorter overall review time. The staff requires this information to assess compliance with 10 CFR 72.236(b).

   More specific guidance on this topic is available in SFPO-ISG-21: "Use of Computational Modeling Software," which was issued on April 5, 2006 and is available on the NRC website.

2. Use of Computational Fluid Dynamics (CFD) methods

   a. Provide methodology for determining porous media flow-resistance parameters.

      One approach to obtaining the flow-resistance parameters of a porous medium would be to use the methodology given in E.M. Sparrow and A.L. Loeffler, in "Longitudinal Laminar Flow Regime Between Cylinders Arranged in Regular Array," American Institute of Chemical Engineering Journal, Volume 5, Number 3, pages 325-330 (September 1959). For a square array, the parameter "F" used to calculate the friction factor has been found to have a value around 100, depending on p/d and the porosity of the array, where d is the fuel rod diameter and p is the fuel rod pitch. The friction factor is then calculated as f = F/Re, where Re is the flow Reynold's number.

      Another acceptable approach would be to perform a CFD analysis for each type of fuel assembly, for the expected operating conditions (pressure and average gas temperature) when it is inside the dry storage cask. The CFD results are then used to calculate the friction factor that is needed to calculate the porous media flow parameters. From the CFD calculation, the wall-shear stresses should be obtained separately for bare fuel rods and for fuel rods plus grid straps. These results, combined with the flow Reynolds number (based on the applicable hydraulic diameter [D_h]), can then be used to calculate

the F parameter. Staff requires this information to assess compliance with 10 CFR 72.236(b).

b. Justify the assumption of using CFD codes to model buoyancy-driven flows.

The staff believes that to justify the assumption of conditions of fully developed turbulent flow in air annular gaps (for ventilated storage casks), it would be necessary to validate the assumption by comparing it with experimental data obtained from a geometry that closely resembles the ventilated cask system geometry. Also, the applicable turbulent flow option should be fully justified. Staff's analysis of the VSC-17 Ventilated Concrete Cask has indicated that the use of the k-omega turbulent flow model (which includes transitional flow) may produce the best fit to experimental data. Staff requires this information to assess compliance with 10 CFR 72.236(b).

c. Justify the use of convection correlations for modeling internal natural circulation.

To take into consideration natural internal circulation, some applicants frequently apply convection correlations that were developed for a geometry which differs significantly from the proposed design, in terms of geometry and boundary conditions. Through RAIs, staff have repeatedly described these issues and proposed alternative approaches (e.g., use of CFD). On more than one occasion, the applicants have provided CFD analyses that were not properly developed, or lacked the necessary details to capture the physics of the flow problem in a more realistic way. The staff requires this information to assess compliance with 10 CFR 72.236(b).

3. Justify the acceptance criteria for performing vacuum-drying operations.

When performing-vacuum drying operations, the acceptance criteria in the Technical Specifications (TS') usually involves a pressure-rise test. This pressure-rise test needs to be performed with the vacuum pump isolated and shut down. As an alternative to shutting down the vacuum pump, the pressure on the pump side of the closed isolation valve could be opened to atmosphere via a tee connection on the vacuum pump's suction. Both these configurations would prohibit a leaking isolation valve from inappropriately maintaining the pressure in the canister below its vacuum test-pressure limit. The consequence to performing an invalid pressure-rise test would be leaving more water in the canister than the design justifies and possibly adversely affecting fuel-cladding integrity. The staff requires this information to assess compliance with 10 CFR 72.236(b).

4. Accident Analysis

   a. Address the following issues in the Fire Analysis.

      For the cases that rely on a real test (generally in a furnace), the applicant should address:

      i. The initial thermal condition of the cask being tested (after the most damaging drop accident, in the shade, with the hottest internal heat source);
      ii. The similarity between the furnace test and a fully enguifing fire (per regulations); and
      iii. The post-fire conditions (in the sun, no wind) on the package

      For cases that rely on computer models, the 800° centigrade (°C) should be directly applied to the external surface of the package, rather than going through a derivation of radiation and convection conditions, between the fire and the cask surface.

      For cask designs showing external heat exchangers, some applications do not address the most limiting situation: depending on the orientation of the cask relative to the fire, the fire can go right through the fins, which brings the heat source a lot closer to the cask internals. Some applications do not analyze a situation like this, which could result in non-conservative or not-bounding predicted peak cladding temperatures. The staff requires this information to assess compliance with 10 CFR 72.236(b).

5. Justify the uncertainties used in your calculations.

   Applications have on some occasions not included the associated uncertainties related to the computational method, input model, assumptions, etc. NRC staff has subsequently then requested that this information be included in the predicted results.

   The staff requires this information to assess compliance with 10 CFR 72.236(b).

Examples of Recurring Containment RAIs

6. Damaged Fuel

   a. Clarify the definition of damaged fuel, especially for high burn-up assemblies. The applicant should consider adopting the definition of damaged fuel in the latest revision to the staff guidance contained in ISG-1, "Damaged Fuel," or a suitable alternative, to avoid inappropriate classification of fuel assemblies.

This information is being requested under the provisions of 10 CFR 71.31, to verify compliance with 10 CFR 71.33.

b. Clarify how the end caps fit onto the basket fuel compartments to confine damaged fuel assemblies. Additionally, clarify whether the damaged fuel would be retrievable by normal means (grapple and crane).

It is not clear how the end caps are attached to the fuel basket. Additionally, it is not clear whether the damaged fuel assemblies will be retrievable by normal means, with the use of end caps, as opposed to a damaged fuel can. The current staff guidance contained in the latest revision to ISG-1, "Damaged Fuel," states that damaged fuel should be placed into a damaged fuel can that is retrievable by normal means.

Retrievability of damaged fuel is covered under the regulations found in 10 CFR 72.236(h), and 72.236(m), and additional guidance may be found in ISG-2, "Fuel Retrievability."

7. Inappropriate use of "leak-tight"

a. Containment Safety Analysis Report (SAR) Sections should be changed to reflect that the confinement boundary has no credible leakage, not that it is "leak-tight."

The term "leak-tight" is defined by American National Standards Institute (ANSI) N14.5 - 1997, and implies that leak testing has been performed on the confinement boundary as a whole. Applicants sometimes use the term "leak-tight" inappropriately. This information is being requested to clarify the applicant's use of "leak-tight," to ensure the safety of the package, and to clarify what leakage tests are being performed.

b. For Type B packages that use the methods described in ANSI N14.5, to demonstrate that they meet the requirements of 10 CFR 71.51:

Revise the application to provide additional information regarding the preshipment leakage test that is performed after the package is loaded, before each shipment. The following information should be included:

i. Clarify the test methods that may be used to perform the pre-shipment leakage test (e.g., pressure-rise or pressure-drop test.)

ii. Clarify the sensitivity of the test, and show that the sensitivity meets the criterion in ANSI N14.5, i.e., a sensitivity of at least $1x10^{-3}$ reference-cubic centimeters per second (1E-3 ref-cc/sec). Include the test parameters that are important in determining the test sensitivity (e.g., pressure

differential and time duration of a pressure-rise test). Show how the sensitivity of the test was determined.

iii. Specify the acceptance criterion of the test (e.g., the maximum pressure change during the test time period for a pressure-rise test.) Show that the acceptance criterion is consistent with the minimum test sensitivity. Note that any leakage greater than the reference leak rate (L_R) is not acceptable.

iv. Clarify that if the seals of the package are changed, then the leakage test must demonstrate that, for the new seal, the package leakage rate does not exceed L_R. The sensitivity of the test should be at least ½ L_R.

8. Justify the methodology used for leakage-rate testing.

a. Applicants need to ensure that they are using the appropriate testing methodology for the desired test sensitivity for their maintenance and fabrication testing.

9. Justify the testing of drain/vent port welds on cask lid.

a. Describe how the integrity of the vent and drain port cover welds will be assured.

Provide justification that leakage from the confinement boundary is not credible, and therefore no confinement analysis is required to be performed for the containment system. SFPO-ISG-18, "The Design/Qualification of Final Closure Welds on Austenitic Stainless Steel Canisters as Confinement Boundary for Spent Fuel Storage and Containment Boundary for Spent Fuel Transportation" refers only to the final closure weld of austenitic stainless steel canisters, not to the entire confinement boundary. As the vent and drain port cover welds comprise a portion of the confinement boundary, the applicant is required to demonstrate that the leakage rates are within acceptable limits.

The information listed for the above containment RAIs is necessary to determine compliance with 10 CFR Parts: 71.51 (a)(1) & (2), 71.43(a), 72.104, 72.106, 72.128(a)(3), and/or 72.236(e) & (j).

Examples of Recurring Structural RAIs

10. Drawings

a. Staff has requested specific information about engineering details, dimensions, and material specifications. For example:

i. Provide the construction details at the junction of the dry storage container (DSC) top-closure plate and the shell structure, by showing a sectional view of the plate-to-shell joint detail.

ii. Show that adequate radial and longitudinal gaps have been provided between the basket assembly and the DSC cavity, to accommodate differential thermal expansion and to minimize thermal stresses in the basket assembly.

iii. Provide the thickness of major components on the drawing. The 'Bill of Material' on the drawing must show the material specifications, with relevant dimensions, such as the thickness of all structural components.

iv. Provide additional detail on the drawings that clearly indicate where information is located. Refer to NUREG-1536 for drawing specifications.

This information is necessary to determine compliance with 10 CFR Parts: 71.7(a), 71.33(a), and/or 72.11(a).

b. For package amendments that include revised or updated packaging drawings:

As specified in 10 CFR 71.31, the application should include a description of all changes made to the packaging drawings. For each change, include an evaluation that shows that the change will not affect the ability of the package to meet Part 71. This is necessary and required by 10 CFR 71.31.

11. Principal Design Criteria

We have requested specific information or may disagree with the applicant in the area of design criteria. For example:

a. Your analyses have shown permanent plastic deformation in the seal region of the containment. Inelastic deformation is specifically discouraged by the SRP (NUREG-1609). The applicant used nonlinear structural analysis methods and criteria as given by American Society of Mechanical Engineers (ASME), Section III, Appendix F. In Regulatory Guide 7.6, "Design Criteria for the Structural Analysis of Shipping Cask Containment Vessels," NRC staff specifically discourages the use of nonlinear structural analysis for containment, as given in Appendix F, because of the lack of data sufficient to formulate substantial nonlinear criteria that assure containment for bolted closures.

b. Given the large variability of material properties of the impact limiters, the margins between the calculated and design allowable stresses in the Containment Structural Assembly are unacceptably small (e.g., 0.001).

c. None of the drop tests conducted on the half-scale models was performed after design modifications were made, to add puncture-resistant steel sheets to the closure lid. The half-scale tests performed did not have sufficient instrumentation to provide data needed to validate the computer analyses. It is not clear to the staff that the modified cask/package design conforms with the design when was tested and analyzed.

d. Provide details on weldments. For example, weld sizes, etc.

This information is necessary to determine compliance with 10 CFR Parts: 71.7(a), 71.33(a), 71.73, and/or 72.11(a).

12. Structural Evaluation

We have requested specific structural analysis or additional information to justify analysis results. For example:

a. Perform a top-end corner-drop dynamic-impact analysis of the transfer cask, to show the adequacies of the welds between the inner shell and the top forging.

The inner shell is attached to the top forging by fillet welds. It is unclear that the welds have adequate strength to prevent separation of the shell from the forging in a top-end corner-drop of the transfer cask. The staff requires this information to assess compliance with 10 CFR 72.236(b).

b. Provide the basis and justification for applicability of the temperature-dependent material properties shown in the proposed application.

The maximum temperature of the concrete surface exceeds the temperature limits in the American Concrete Institute (ACI) 349, A.4.2. Indicate where the temperature-dependent material properties of the concrete are provided. Provide relevant information or the references to justify the material properties. The staff requires this information to assess compliance with 10 CFR 72.11.

c. The stability criteria (i.e., allowable buckling loads) stated in your application are not acceptable. Revise the application to calculate the critical loads for buckling of the shell and the basket structure. The buckling evaluation should consider elastic, inelastic, and local buckling, if applicable. Reasonable safety factors for the allowable buckling loads should be provided to take into account material and geometrical imperfections.

The applicant stated that: "The acceptance criteria are taken from ASME Code, Sect. III. Appendix F, paragraphs F-1341.3, 'Collapse Load.' Collapse-load evaluation for a given combination of loads on a given structure is to ensure that the strains or deflections of the structure are acceptable for load-carrying

purposes." Thus, collapse-load evaluation is a strength consideration and cannot be used to substitute a buckling evaluation. The staff requires this information to assess compliance with 10 CFR 72.236(b).

13. Technical Specifications (TS')

We may request revisions or clarifications to the TS'. For example:

a. Clarify that the term "cask" in the TS' means a loaded transfer cask (TC). The staff requires this information to assess compliance with 10 CFR 72.122(b).

b. Tests to demonstrate concrete capability (or reduction of strength) for elevated temperatures should be specified in the TS'.

Temperature requirements of ACI 349, A.4.2, stated that the concrete surface temperatures shall not exceed 177 °C (350 °F) for accidents or any short-term period (93 °C [200 °F] for normal operations). Since the concrete temperature is higher than the ACI 349 allowable, tests shall be performed for the cement type and aggregates selected to confirm concrete capability (e.g., compressive strength and shielding capability). The staff requires this information to assess compliance with 10 CFR 72.236(b).

c. Revise the TS' for TC lifting heights to include applicable loading operations. Based on the definition of loading operations, it is necessary to address cask lifting heights for loading operations. The staff requires this information to assess compliance with 10 CFR 72.11 and 10 CFR 72.236(b).

14. Finite-Element Analysis

a. Justify the assumptions regarding the validation/benchmarking of the computer code used.

Often the applicant provides a numerical model, however, the applicant does not always indicate for what conditions the model is valid.

b. Provide additional details on how the model was developed.

Often the applicant provides an overview of the model, results, and conclusions, but does not always provide details as to how the model was developed.

c. Justify your use of simplifying assumptions and boundary conditions.

Often the applicant provides a model with no information as to how, the model was simplified, either in whole or in part. This typically will apply to geometry and boundary conditions.

d. Provide additional information on material-property development.

The applicant will give simple material-property information for all materials, including new or novel ones. Often there will not be enough information about the background and validity of the material property used to justify its intended use and function.

e. Provide additional information on package loading and time steps.

Often the applicant will not indicate any information on loading, with the exception of load magnitudes. Time steps need to be addressed.

f. Include additional information or perform sensitivity studies.

Applicants often do not include this information in their applications.

g. Provide additional details on the results, as well as supporting documentation.

Results are typically in the form of a summary table, which gives the reviewer very little information or basis to determine if the results are valid.

The RAIs cited above are necessary to determine compliance with 10 CFR Parts: 71.7(a) and/or 72.11(a).

Examples of Recurring Criticality-Safety RAIs

15. Computer Modeling

a. Provide representative sample input files.

NRC staff frequently needs to request additional sample input files to cover what is described in the applicant's document. Representative samples of each geometry configuration, as well as samples of the bounding or most reactive configuration, should be submitted. Important examples of different configurations are intact fuel, damaged fuel and fuel debris, and loose or consolidated rods.

b. Describe and justify any differences in the modeling approaches and code options that exist between the benchmark and design computations.

Sometimes the code developer's input files are copied to benchmark or validate code calculations. These input files may not be representative of the types of modeling approaches the applicant used. The applicant needs to use the same methodology and constraints as the validation models. This is usually done

when the analyst models both the benchmarks and the design calculations. At a minimum, the modeling approaches, cross-section set, and code options should be the same as those used for the design calculations. Any differences between the two calculations need to be identified, evaluated, and justified.

This information is necessary to determine compliance with 10 CFR Parts: 71.33, 71.55, 72.24 and/or 72.124.

16. Revise TS' to indicate the boron (^{10}B) percent credit, the manufacturer's trade name, the minimum areal density required to be measured, and the volume percent of B_4C used in metal matrix composites for each neutron absorber proposed for this application.

NRC is currently reviewing whether applicants should be allowed greater than 75 percent credit for BORAL. The applicant should not consider an allowance of greater than 75% credit for BORAL in the criticality analysis unless the applicant has the appropriate test data to support a greater credit. Furthermore, the applicant should provide neutron-attenuation testing for materials taking greater than 75% credit in the criticality analysis. Note that an applicant would need to present an acceptance criterion for neutron attenuation in the criticality analysis for any absorber in which a greater credit than 75% is taken. For tests methods other than neutron attenuation, the applicant should benchmark the results of the proposed acceptance test method against the results of neutron-attenuation examination.

This information is necessary to determine compliance with 10 CFR Parts: 71.33, 71.55, 72.24 and/or 72.124

Examples of Recurring Shielding RAIs

17. Burnup Questions

a. Revise all relevant sections of the application where burnup is indicated, including technical specifications to indicate peak average burnup per rod. Burnup should be limited to no more than 62.5 gigawatt days per metric ton of uranium (GWd/MTU). Further, throughout the application where burnup is referenced, specify whether it is the peak rod burnup, average rod burnup, peak assembly burnup, etc. (Note: peak average rod burnup is determined by averaging the burnup in any rod over the length of the rod, then using the highest burnup calculated for any rod as the peak average for the assembly.)

As stated in ISG-11, Revision 3, "Cladding Considerations for the Transportation and Storage of Spent Fuels," approval for storage and transport will be granted only for burnups, up to that approved by the Office of Nuclear Reactor Regulation (NRR) for reactor operation. For example, the value is currently 62.5 GWd/MTU peak average for pressurized-water reactor (PWR) fuel

(as of 01/2007). This information is needed to determine compliance with 10 CFR 72.122(h)(1).

b. Provide additional information on how the source term for the PWR and boiling-water reactor (BWR) fuel with high burnup was determined.

In one example the application indicated that the SAS2H module of SCALE4.4 was used to develop source terms for a range of average burnups and initial enrichments. However, as noted in NUREG-1536, many libraries used in the codes are not appropriate for burnups greater than 33,000 MWd/MTU. Properties of the fuel as they come out of the reactor are the basis for analysis of its performance and affect the performance of the components. These properties and characteristics of fuel up to the NRR-approved limit are well-documented and researched. As such, staff has recommended that burnup in dry storage be limited to that approved for in-reactor irradiated fuel.

If the applicant wants to exceed the NRR-approved limits, it would need to provide adequate information on the properties and behavior of the fuel, to warrant the higher burnup limit. Lack of such information necessitates RAIs or reduction of the burnup limit. This information is necessary to determine compliance with 10 CFR Parts: 71.33, 71.47 and/or 72.126

18. Use of Codes

a. Provide information on the verification and validation of any non-standard codes. Also, provide information on how any code was modified.

Additional information is required to indicate how the code was modified, by whom, and/or the process used to validate the code after modification.

b. Provide sample inputs of SAS2H, MCNP, and MCBEND, etc., of the design basis fuel.

c. Explain why the cited neutron spectrum was used, or revise the application to indicate what the appropriate neutron spectrum is. If the application indicates that the neutron energy spectrum was rebinned, the applicant must justify the methodology.

d. Ensure that the analyzed case in the application is actually the bounding case and justify why it is bounding.

This information is necessary to determine compliance with 10 CFR Parts 71.33, 71.47 and/or 72.126

Examples of Recurring Materials RAIs

19. Acceptance Criteria

    a. Provide an addition to the Acceptance Criteria to include the quality assurance /quality control (QA/QC) requirements for the testing of non-standard neutron-absorber material(s).

       Non-standard neutron absorber materials are not subject to the uniform production and QC standards that exist for ASME Code materials. Additionally, there is no reasonable manner to verify the performance of these materials during service. The function they perform is of high importance, eliminating the possibility of an inadvertent criticality. Consequently, the NRC staff finds that the production and QC methods and requirements of these materials need to be better formalized. This information is necessary to determine compliance with 10 CFR Parts: 71.33, 72.122 and/or 72.124

    b. Revise application to justify the acceptance criterion for determining the minimum boron concentration in a neutron absorber, especially the sampling techniques used.

       The concern is that statistical consideration (e.g., assuming that every sampled coupon is like every part of the neutron absorber) may lead to the conclusion that coupons having detected malformations can be rejected from statistical analyses. This information is necessary to determine compliance with 10 CFR Parts: 71.33, 72.122 and/or 72.124

20. Justify or delete the expression "equivalent metal matrix composites (MMCs)" when used to substitute unidentified neutron-absorbing materials.

    This expression implies that products other than those listed may be used, but there are no equivalent MMCs that have been included in or evaluated in the application. Materials not properly qualified for this application may not be substituted for the listed neutron-absorber materials. This information is necessary to determine compliance with 10 CFR Parts: 71.33, 72.122 and/or 72.124.

21. Include the specific types/configurations of fuel allowed to be loaded into a cask.

    Fuel types and configurations are sometimes listed in the CoC, but not addressed in the licensee's application. This information is necessary to determine compliance with 10 CFR Parts: 71.33 and/or 72.124.

Examples of General Transportation Application Review RAI

22. Clearly show that the package meets the current regulatory requirements that became effective on October 1, 2004 (69 FR 3698), when requesting NRC approval of the transport application for a "-96" certification from a previously approved NRC transport certificate for a "-85" application.

    The applicant should address all applicable sections of the revised new rule. For each of the new requirements (14 issues identified in the supplementary information in the new revised rule), identify if the change is applicable to this package, and if so, explain how the package meets the new rule, including the location in the application of any revision that was made to meet the new rule.

    This information is requested in accordance with 10 CFR 71.7(a).

Examples of General Items to be Aware of to Avoid Common Recurring RAIs

23. Provide the references used in the justification.

    Staff commonly needs to review the references an applicant cites as part of the NRC review. For example, the justification of a particular parameter may be based on an external reference: however, the reference is often not included in the applicant's submittal or is not readily available.

24. References to ISGs in the application.

    If an applicant chooses to cite an adopted ISG in his/her application, there would likely be fewer resultant RAIs since NRC staff uses the ISGs identity as approaches the staff have already found to be acceptable in many of the specified regulations and requirements.

25. Recommend that the applicant update his/her SAR after each RAI, to incorporate the information requested by staff.

26. Many RAIs could be eliminated simply by the applicant using our guidance documents (Regulatory Guides, NUREGs, etc.). If the applicant is using a different approach in his/her application, the applicant should indicate this and adequately justify the approach.

27. The applicant may want to consider providing a draft CoC with his/her submittal, to assist staff in its review and to provide clear expectations on what the applicant is needing or anticipating.

28. Many times the SAR is not consistent throughout, which can lead to confusion on what the package/cask looks like. This typically happens when a design is modified part way through the SAR preparation, or after RAIs and other parts of the SAR are not updated. Before submittal, the SAR should be reviewed for consistency throughout, including the introductory section, technical section descriptions, drawings, figures, tables, and CoC/TS.

29. Items to be aware of regarding leak-testing under ISG-18 to avoid RAI questions.

    a. Lid Welds - Exemption from helium leak test requirement

        i. Consists of at least three distinct weld "layers" of one or more adjacent passes.

        ii. The root pass, an intermediate pass, and cover pass must be PT (Penetrant Test) examined.

        iii. For intermediate layers, the maximum weld depth is based on flaw-tolerance calculations that may be found in SFPO-ISG-15, "Materials Evaluation," although an applicant may propose other justifiable methods.

    b. Confinement Boundary

        i. Redundant sealing (closures) of the confinement system is required to comply with 10 CFR 72.236(e).

        ii. At least one of the two redundant seal boundaries must be helium leak-tested by actual test, as described in ISG-18 and tested, or the weld closure(s) designed to comply with the helium leak test exemption. A combination of these two methods may also be employed for the different welds of one closure boundary.

        iii. Any and all welds that are either under pressure, or potentially under pressure because of assumed valve leakage at the time of welding, must be helium leak-tested.

        iv. All canister shell confinement welds must be volumetrically examined, have surface examination (PT or MT), and be helium-leak tested.

        v. The lid confinement boundary needs to be consistently defined, in the SAR, to determine whether leak testing, for weldments, is necessary under ISG-18.

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